

ABSTRACT OF THE INVENTION

An x-ray tube cooling system for removing heat from the bearing assembly and bearing housing of a rotating anode type x-ray device. The x-ray tube cooling system includes a heat sink at least partially disposed within an evacuated housing of the x-ray tube and having a copper cooling block partially received within the bearing housing so as to absorb heat transmitted to the bearing assembly and bearing housing as a result of x-ray tube operations. A plurality of extended surfaces, preferably comprising copper or a copper alloy and attached to the cooling block by way of a post, are disposed in a coolant chamber cooperatively defined by the cooling block and a shell within which the cooling block is partially received. The shell is preferably composed of a high strength steel so as to lend structural rigidity to the combination of the bearing housing and heat sink, and defines a coolant chamber entrance and coolant chamber exit in fluid communication with the coolant chamber. The coolant chamber entrance and exit, in turn, communicate with corresponding coolant inlet and outlet passageways, respectively, cooperatively defined by a pair of insulators which retain the heat sink in a predetermined orientation within an evacuated envelope of an x-ray device. An external cooling unit in fluid communication with the coolant chamber continuously circulates a flow of dielectric coolant through the chamber, by way of fluid conduits connected to the coolant inlet and outlet passageways defined by the insulators, so that the circulating coolant contacts the extended surfaces and thereby removes heat from the bearing assembly, bearing housing, and related structures of the x-ray device.